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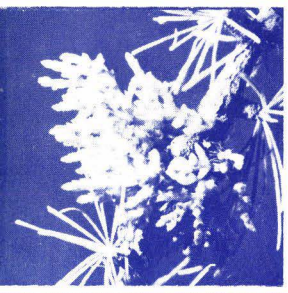

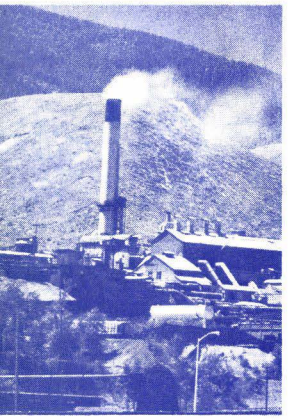

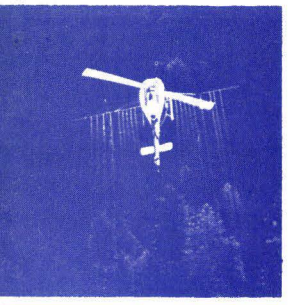

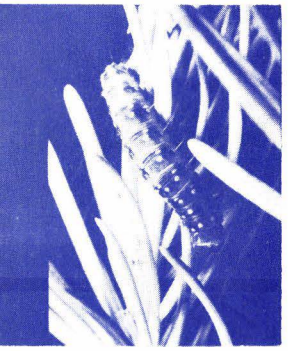

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Report No. 78-11

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POTENTIAL PINE BUTTERFLY DEFOLIATION IN 1978 IN WESTERN MONTANA

By

Scott Tunnock and Hubert Meyer[1/]

INTRODUCTION

An epidemic of pine butterfly, Neophasia menapia (Felder & Felder), caused injury to over 40,000 acres of ponderosa pine, Pinus ponderosa Laws, in the Bitterroot Valley and Missoula area from 1969 to 1973. (Ciesla et al. 1971; Meyer and Ciesla 1973). Infestations also occurred on the National Bison Range during 1972 and were predicted for 1973 (Bousfield 1972); and from 1972 through 1976, light defoliation occurred in spots along the Mission Mountains from Pablo to St. Ignatius. Also in 1976, light to heavy defoliation was detected in about 1,500 acres of ponderosa pine west of Big Arm in the Irvine I Logging Unit, Flathead Indian Reservation (Tunnock and Meyer 1977).

During the summer of 1977, more than normal numbers of adult pine butterflies were observed flying in pine stands in the Bitterroot Valley. About 200 acres of defoliation were detected in the southwest corner of the National Bison Range. Defoliation was obvious again in the Irvine I Logging Unit, and on 1,200 acres about 2 miles to the southwest.

Because of this increase in damage, a survey of overwintering pine butterfly eggs was made to determine potential defoliation in 1978.

The life history and habits of the pine butterfly are well described by Cole (1961), and the impact of continued heavy defoliation was reported by Cole (1961) and Evenden (1940).

1/ Entomologist and Biological Technician, respectively, State and Private Forestry, Forest Insect and Disease Management, USDA Forest Service, Missoula, Montana.

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METHODS

During January 1978, 19 plots were sampled for egg densities. These plots were within the Flathead Indian Reservation, National Bison Range, and Lolo and Bitterroot National Forests (figures 1-3).

The sampling method used and the subsequent defoliation predictions were developed by Bousfield and Dewey (1972). Defoliation predictions are based on the number of viable eggs per 5-inch branch sample and percentage of trees showing defoliation.

At each plot, six 5-inch branch tips were cut with an extendable pole pruner from midcrown from each of 10 trees. Branch tips were placed in a nylon bag which was labeled with plot name and location. Twenty trees were examined for visible defoliation. The 60 branch samples from each plot were brought back to Missoula and their needles examined for eggs. Viable (green) eggs were counted and the average number per 5-inch branch determined. Nonviable eggs, which are whitish and dry inside, were not counted.

RESULTS AND DISCUSSION

National Bison Range.--The area in the southwest portion of the Range was heavily defoliated in 1977 (figure 1). An average of 38.2 eggs per 5 inch branch was found in this area (table 1). It is predicted that 50 percent of the remaining needles on these trees will be consumed in 1978 (table 1). This infestation may spread to other ponderosa pine stands on the Range. More plots will be taken at different points in 1978 to determine any spread. If heavy defoliation continues in 1979, which is doubtful, some trees may be killed in the southwest stand.

Flathead Indian Reservation.--The infestation in the Irvine Logging Unit (figure 1) is decreasing and defoliation should be very light in this area in 1978 (table 1). Most of the overstory ponderosa pine trees were heavily defoliated in 1976 and 1977 and many contain only 1977 needles. Some top kill is beginning to appear. If the infestation ends in 1978, these damaged trees should gradually accumulate more needles and recover.

Samples were not obtained from the defoliated 1,200-acre area southwest of Irvine Unit. Defoliation will likely continue in this area during 1978.

No defoliation is predicted in North Crow Creek (figure 1) during 1978 (table 1). This infestation seems to have died out.

During the same time samples were being collected for pine butterfly eggs, 11 other plots were sampled for a needle miner in ponderosa pine on the Reservation. Foliage from nine of these needle miner plots contained pine butterfly eggs. These areas and number of eggs found are tabulated on the following page:

Plot location	Eggs per 2,500 needles
Agency Cr. (T. 16 N., R. 19 W., sec. 22)	26
Ashley Cr. (T. 19 N., R. 19 W., sec. 34)	3
W. of Arlee (T. 16 N., R. 20 W., sec. 9)	16
E. of Arlee (T. 16 N., R. 19 W., sec. 3)	14
NE or Arlee (T. 17 N., R. 19 W., sec. 32)	24
Stevens Cr. (T. 16 N., R. 19 W., sec. 4)	61
McClure Cr. (T. 16 N., R. 19 W., sec. 28)	23
Mission Res. (T. 18 N., R. 19 W., sec. 15)	12
Mikes Cr. (T. 18 N., R. 19 W., sec. 26)	16

There are enough eggs in these nine areas to cause very light defoliation in 1978. Defoliation in Stevens Creek may be slightly heavier.

Lolo National Forest.--The five areas sampled around Missoula (figure 2) showed no current defoliation. We predict defoliation will range from zero to very light on them in 1978 (table 1).

Bitterroot National Forest.--None of the 11 locations sampled in the Bitterroot Valley (figure 3) contained visible defoliation. Defoliation will be mostly negligible on them in 1978 (table 1). Only Antrim Point may show very light defoliation.

Pine butterfly populations are not increasing alarmingly in western Montana as conjectured in 1977. The only heavy damage expected in 1978 will be on the National Bison Range. The infestation on the Flathead Indian Reservation is lasting longer than expected, and may be increasing on the southern portion. This area will be checked more closely during the 1978 survey season.

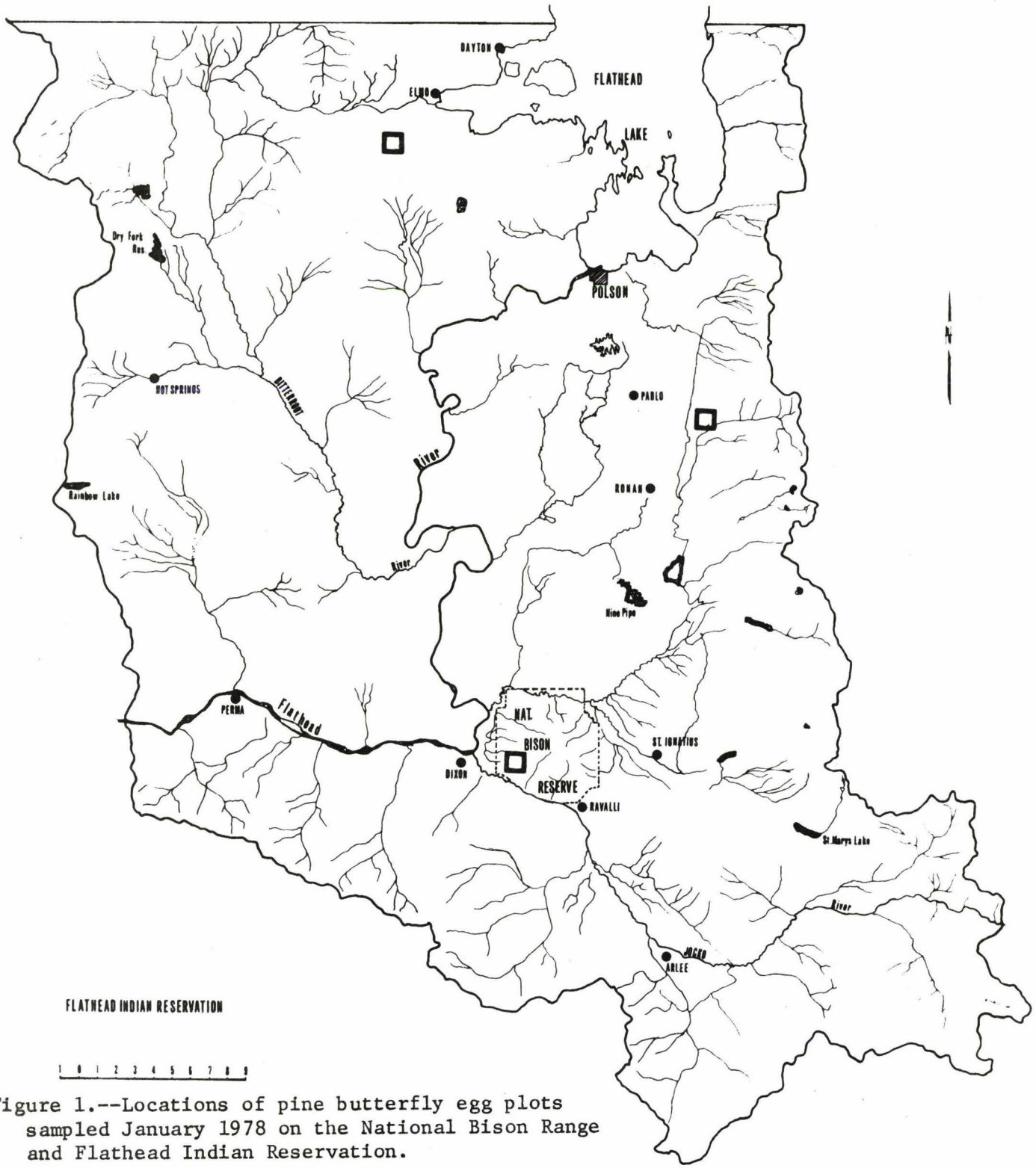

Figure 1.--Locations of pine butterfly egg plots sampled January 1978 on the National Bison Range and Flathead Indian Reservation.

□ Plot location

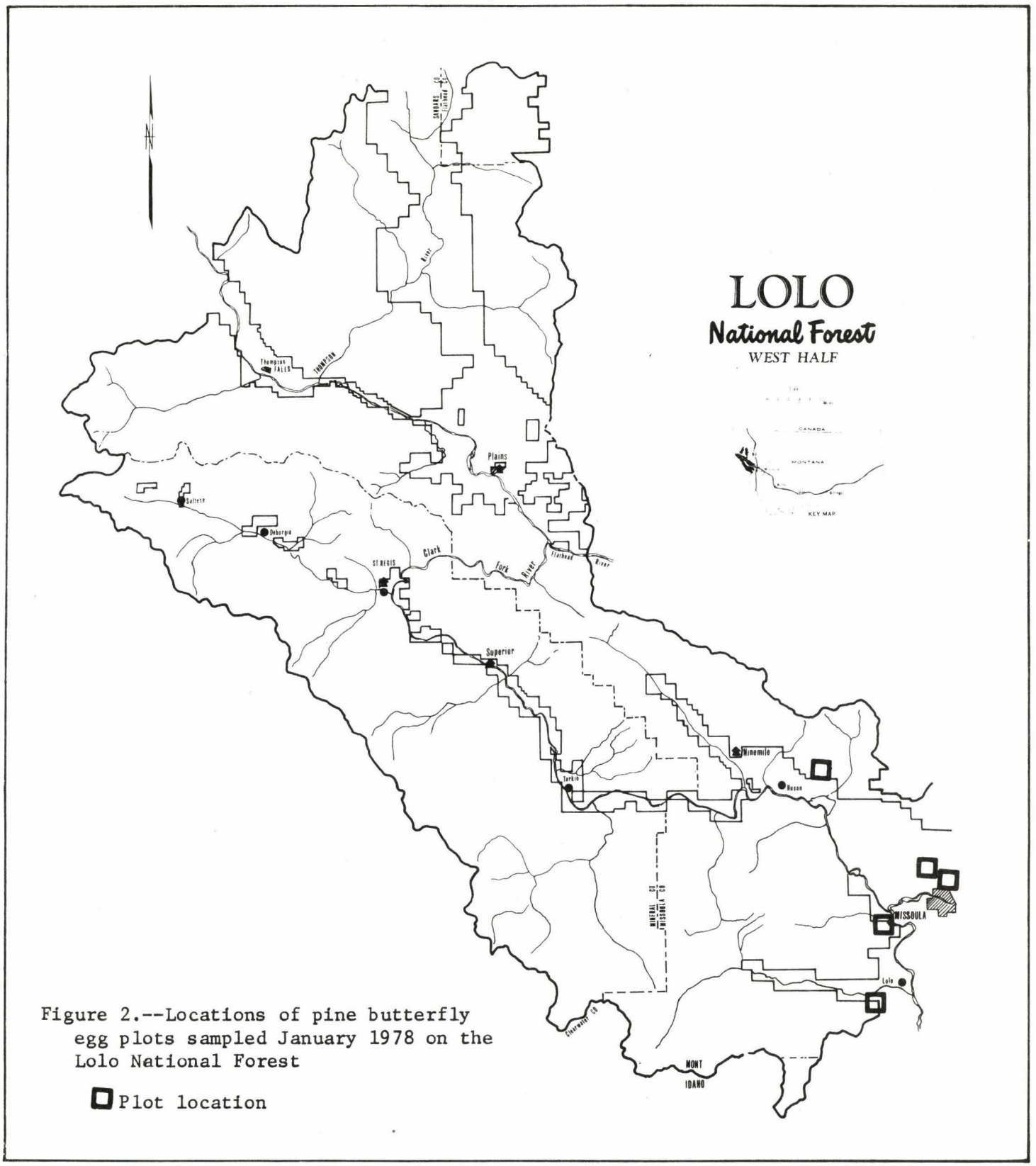

Figure 2.--Locations of pine butterfly egg plots sampled January 1978 on the Lolo National Forest

Plot location

Figure 3.--Locations of pine butterfly egg plots sampled January 1978 on the Bitterroot National Forest.

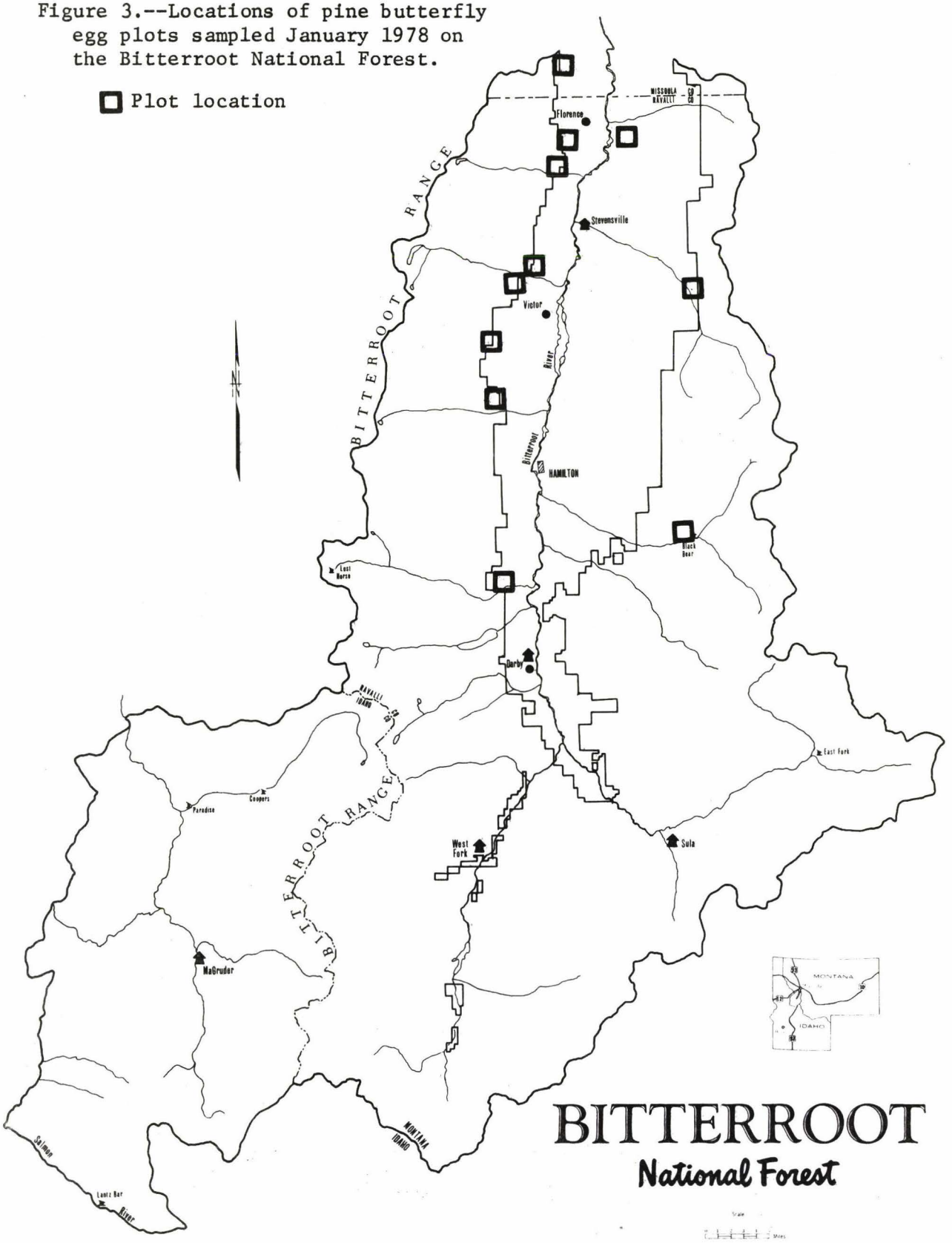

Table 1.--Potential defoliation by the pine butterfly in 1978 on plots sampled in western Montana

Plot location	Avg. No. eggs per 5-inch branch	Trees showing defoliation (percent)	Defoliation index	Predicted defoliation in 1978 (percent or category)
BISON RANGE (SW corner)	38.2	100	2.5	50
FLATHEAD INDIAN RES.				
Irvine Unit (T. 23 N., R. 22 W., sec. 3)	0.23	100	1.9[1/]	Very light
N. Crow Cr. (T. 21 N., R. 19 W., sec. 16)	-0-	0	--	0
LOLO NATIONAL FOREST				
Rattlesnake (T. 14 N., R. 19 W., sec. 26)	0.32	0	--	Negligible
Edith Cr. (T. 15 N., R. 21 W., sec. 22)	1.02	0	--	Negligible
Grant Cr. (T. 14 N., R. 19 W., sec. 16)	-0-	0	--	0
Mormon Pk. Rd. (T. 11 N., R. 20 W., sec. 8)	2.85	0	--	Very light
Blue Mtn. (T. 12 N., R. 20 W., sec. 4)	-0-	0	--	0
BITTERROOT NATIONAL FOREST				
McClean Cr. (T. 11 N., R. 20 W., sec. 21)	1.68	0	--	Negligible
Sweeney Cr. (T. 10 N., R. 20 W., sec. 16)	0.03	0	--	Negligible
Bass Cr. (T. 10 N., R. 20 W., sec. 32)	0.68	0	--	Negligible
St. Mary's (T. 8 N., R. 21 W., sec. 2)	1.73	0	--	Negligible
Big Cr. (T. 8 N., R. 21 W., sec. 14)	1.28	0	--	Negligible
Gash Cr. (T. 7 N., R. 21 W., sec. 9)	0.28	0	--	Negligible
Cow Cr. (T. 7 N., R. 21 W., sec. 23)	1.58	0	--	Negligible
Antrim Pt. (T. 10 N., R. 19 W., sec. 18)	2.45	0	--	Very light
Burnt Fk. (T. 8 N., R. 19 W., sec. 13)	-0-	0	--	0
Skalkaho (T. 5 N., R. 19 W., sec. 29)	0.88	0	--	Negligible
Lost Horse Cr. (T. 4 N., R. 21 W., sec. 8)	1.95	0	--	Negligible

1/ Because current defoliation was evident on 100 percent of the 20 trees examined, this carries heavy weight in the regression equation and causes a high defoliation index even when egg numbers are insignificant.

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